

CLAIMS

1. A method for manufacturing a glass or ceramic disk substrate for a rotating disk drive data storage device, comprising the steps of:

providing a ceramic or glass disk substrate having a circumferential edge;
loading said disk substrate to an edge finishing apparatus; and
grinding said circumferential edge of said disk substrate in a ductile grinding regime using said edge finishing apparatus.

2. The method for manufacturing a glass or ceramic disk substrate of claim 1, wherein said disk drive data storage device is a rotating magnetic disk drive data storage device, said disk substrate being subsequently coated with a magnetic coating after said grinding step.

3. The method for manufacturing a glass or ceramic disk substrate of claim 1, further comprising the step of coarse grinding said circumferential edge in a non-ductile mode, said step of coarse grinding said circumferential edge in a non-ductile mode being performed before said step of grinding said circumferential edge in a ductile grinding regime.

4. The method for manufacturing a glass or ceramic disk substrate of claim 1, wherein said disk substrate contains an outer circumferential edge at the periphery thereof and a central aperture defining an inner circumferential edge, and wherein said grinding step is applied to both said outer circumferential edge of said disk substrate and to said inner circumferential edge.

5. The method for manufacturing a glass or ceramic disk substrate of claim 1, wherein said grinding step comprises grinding said edge with a formed grinding appliance conforming to an edge radius at said circumferential edge.

1 6. The method for manufacturing a glass or ceramic disk substrate of claim 1,
2 wherein said grinding step comprises bringing a grinding appliance of said edge finishing
3 apparatus in contact with said circumferential edge and providing relative motion
4 between said grinding appliance and circumferential edge of approximately 30 m/sec or
5 more.

1 7. The method for manufacturing a glass or ceramic disk substrate of claim 1,
2 wherein said edge finishing apparatus comprises a grinding appliance having diamond
3 particles of approximately 6 microns or less.

1 8. The method for manufacturing a glass or ceramic disk substrate of claim 1,
2 wherein said glass or ceramic disk substrate is finished for installation in a disk drive data
3 storage device without chemical strengthening of said disk substrate.

1 9. The method for manufacturing a glass or ceramic disk substrate of claim 8,
2 wherein said glass or ceramic disk substrate is of a material which is not chemically
3 strengthenable.

1 10. A method for manufacturing a glass or ceramic disk substrate for a rotating disk
2 drive data storage device, comprising the steps of:

3 providing an ceramic or glass disk substrate having a cut, unfinished
4 circumferential edge, wherein said ceramic or glass disk substrate material is not
5 chemically strengthenable; and

6 finishing said circumferential edge of said disk substrate to a finished state
7 suitable for use in a disk drive data storage apparatus using at least one edge finishing
8 apparatus.

1 11. The method for manufacturing a glass or ceramic disk substrate of claim 10,
2 wherein said step of finishing said circumferential edge of said disk substrate comprises
3 grinding said edge in a ductile grinding regime.

1 12. The method for manufacturing a glass or ceramic disk substrate of claim 10,
2 wherein said disk drive data storage device is a rotating magnetic disk drive data storage
3 device, said method further comprising the step of coating at least one flat surface of said
4 disk substrate with a magnetic coating, said coating step being performed after said
5 grinding step.

1 13. The method for manufacturing a glass or ceramic disk substrate of claim 10,
2 wherein said disk substrate contains an outer circumferential edge at the periphery thereof
3 and a central aperture defining an inner circumferential edge, and wherein said finishing
4 step comprises finishing both said outer circumferential edge of said disk substrate and
5 said inner circumferential edge.

1 14. The method for manufacturing a glass or ceramic disk substrate of claim 10,
2 wherein said step of finishing said circumferential edge grinding step comprises forming
3 an edge radius at said circumferential edge.

1 15. A method for manufacturing a glass or ceramic disk substrate for a rotating disk
2 drive data storage device, comprising the steps of:
3 providing a ceramic or glass disk substrate having a cut, unfinished
4 circumferential edge;
5 finishing said circumferential edge of said disk substrate to a finished state
6 suitable for use in a disk drive data storage apparatus by application of mechanical forces
7 using at least one edge finishing apparatus, said finishing step being accomplished
8 without chemical strengthening of said glass disk substrate.

1 16. The method for manufacturing a glass or ceramic disk substrate of claim 15,
2 wherein said disk substrate is of a material which is not chemically strengthenable.

1 17. The method for manufacturing a glass or ceramic disk substrate of claim 15,
2 wherein said step of finishing said circumferential edge of said disk substrate comprises
3 grinding said edge in a ductile grinding regime.

1 18. The method for manufacturing a glass or ceramic disk substrate of claim 15,
2 wherein said disk drive data storage device is a rotating magnetic disk drive data storage
3 device, said method further comprising the step of coating at least one flat surface of said
4 disk substrate with a magnetic coating, said coating step being performed after said
5 grinding step.

1 19. The method for manufacturing a glass or ceramic disk substrate of claim 15,
2 wherein said disk substrate contains an outer circumferential edge at the periphery thereof
3 and a central aperture defining an inner circumferential edge, and wherein said finishing
4 step comprises finishing both said outer circumferential edge of said disk substrate and
5 said inner circumferential edge.

1 20. The method for manufacturing a glass or ceramic disk substrate of claim 15,
2 wherein said step of finishing said circumferential edge grinding step comprises forming
3 an edge radius at said circumferential edge.

1 21. A disk for a rotating disk drive data storage device, comprising a disk-shaped
2 glass or ceramic substrate which is finished for installation in a disk drive data storage
3 device, wherein said disk-shaped glass or ceramic substrate is not chemically
4 strengthened.

1 22. The disk for a rotating disk drive data storage device of claim 21, wherein said
2 disk-shaped substrate comprises a circumferential edge having a radius.

1 23. The disk for a rotating disk drive data storage device of claim 22, wherein said
2 disk-shaped substrate has a central aperture defining an inner circumferential edge radius,
3 and wherein said disk-shaped substrate has a first circumferential edge radius at said inner
4 circumferential edge, and a second circumferential edge radius at an outer circumferential
5 edge thereof.

1 24. The disk for a rotating disk drive data storage device of claim 21, further
2 comprising a magnetic layer for recording magnetically encoded data on at least one
3 surface of said disk.

1 25. The disk for a rotating disk drive data storage device of claim 21, wherein said
2 disk-shaped substrate comprises a circumferential edge finished by a process of grinding
3 in a ductile regime.

1 26. A disk for a rotating disk drive data storage device, comprising a disk-shaped
2 substrate which is of a glass or ceramic material which is not chemically strengthenable.

1 27. The disk for a rotating disk drive data storage device of claim 26, wherein said
2 disk-shaped substrate comprises a circumferential edge having a radius.

1 28. The disk for a rotating disk drive data storage device of claim 27, wherein said
2 disk-shaped substrate has a central aperture defining an inner circumferential edge radius,
3 and wherein said disk-shaped substrate has a first circumferential edge radius at said inner
4 circumferential edge, and a second circumferential edge radius at an outer circumferential
5 edge thereof.

1 29. The disk for a rotating disk drive data storage device of claim 26, further
2 comprising a magnetic layer for recording magnetically encoded data on at least one
3 surface of said disk.

1 30. The disk for a rotating disk drive data storage device of claim 26, wherein said
2 disk-shaped substrate comprises a circumferential edge finished by a process of grinding
3 in a ductile regime.

1 31. A disk for a rotating disk drive data storage device, comprising a disk-shaped
2 substrate which is of a glass or ceramic material, said disk-shaped substrate having a flat
3 data recording surface and a circumferential edge radius at a circumferential edge of said
4 flat data recording surface.

1 32. The disk for a rotating disk drive data storage device of claim 31, wherein said
2 circumferential edge radius is at least 0.175 mm.

1 33. The disk for a rotating disk drive data storage device of claim 31, wherein said
2 circumferential edge radius is approximately one-half the width of said disk-shaped
3 substrate at the circumferential edge thereof, said substrate having an edge cross-section
4 in a plane of the disk axis comprising approximately a semi-circle.

1 34. The disk for a rotating disk drive data storage device of claim 31, wherein said
2 disk-shaped substrate has a central aperture defining an inner circumferential edge radius,
3 and wherein said disk-shaped substrate has a first circumferential edge radius at said inner
4 circumferential edge, and a second circumferential edge radius at an outer circumferential
5 edge thereof.

1 35. The disk for a rotating disk drive data storage device of claim 31, further
2 comprising a magnetic layer for recording magnetically encoded data on said flat data
3 recording surface.

1 36. The disk for a rotating disk drive data storage device of claim 31, wherein said
2 disk-shaped substrate is of a material which is not chemically strengthened.

1 37. The disk for a rotating disk drive data storage device of claim 36, wherein said
2 disk-shaped substrate is of a material which is not chemically strengthenable.

1 38. The disk for a rotating disk drive data storage device of claim 31, wherein said
2 circumferential edge is finished by a process of grinding in a ductile regime.

1 39. A rotating disk drive data storage device, comprising:
2 a disk drive base;
3 a rotatably mounted disk and spindle assembly, said disk and spindle assembly
4 comprising at least one disk for recording data on at least one surface of said at least one
5 disk, said at least one disk comprising a glass or ceramic substrate which is not
6 chemically strengthened; and
7 at least one transducer mechanism for accessing data recorded on said at least one
8 surface of said at least one disk.

1 40. The rotating disk drive data storage device of claim 39, wherein said glass or
2 ceramic substrate is of a material which is not chemically strengthenable.

1 41. The rotating disk drive data storage device of claim 39, wherein said at least one
2 disk further comprises a magnetic layer for recording magnetically encoded data on said
3 at least one surface of said at least one disk.

1 42. The rotating disk drive data storage device of claim 39, wherein said at least one
2 disk comprises a circumferential edge having a radius.

1 43. The rotating disk drive data storage device of claim 39, wherein said at least one
2 disk comprises a circumferential edge which is finished by a process of grinding in a
3 ductile regime.

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